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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/647,475	08/26/2003	Lim Su Lee	8733.311.10-US	2307

30827 7590 03/31/2011
MCKENNA LONG & ALDRIDGE LLP
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WASHINGTON, DC 20006

EXAMINER

MARKOFF, ALEXANDER

ART UNIT	PAPER NUMBER
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1711

MAIL DATE	DELIVERY MODE
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03/31/2011

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/647,475

Applicant(s)

LEE, LIM SU

Examiner

Alexander Markoff

Art Unit

1711

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 February 2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13, 16, 18, 34, 35 and 45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13, 16, 18, 34, 35 and 45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/15/11 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 13, 16, 18, 34, 35 and 45 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

As to claims 13, 16, 18, 34, 35:

The applicants amended the claims to recite "moving the substrate between the first and second cylindrical brushes".

The original disclosure fails to support this limitation. The limitation is not supported for the entire scope. The original disclosure supports only a linear moving of

the substrate such that the direction of moving of the substrate is parallel to the side cylindrical brushes and parallel to the surface of the substrate. The limitation, which is now recited by the claim, also includes other movements of the substrate between the cylindrical brushes, such as moving the substrate side-to-side and up-and-down. Such is not supported by the original disclosure.

The applicants further amended the claims to recite that the first and second cylindrical brushes are rotated to brush the first and the second side surfaces, respectively, to a lower direction or to an upper direction perpendicular to a progress direction of the substrate.

Such is not supported by the original disclosure. The original disclosure only supports rotation of the referenced brushes around their axis.

The applicants further amended the claims to recite moving the substrate between upper and lower brushes.

The original disclosure fails to support this limitation. The limitation is not supported for the entire scope. The original disclosure supports only a linear moving of the substrate such that the direction of moving of the substrate is perpendicular to the upper and lower brushes and parallel to the surface of the substrate. The limitation, which is now recited by the claims, also includes other movements of the substrate between the upper and lower brushes, such as moving the substrate side-to-side and up-and-down. Such is not supported by the original disclosure.

The applicants further amended the claims to recite moving the substrate between first and second jetting devices.

The original disclosure fails to support this limitation. The limitation is not supported for the entire scope. The original disclosure supports only a linear moving of the substrate such that the direction of moving of the substrate is perpendicular to the line between jetting devices and parallel to the surface of the substrate. The limitation, which is now recited by the claims, also includes other movements of the substrate between the jetting devices, such as moving the substrate side-to-side and up-and-down. Such is not supported by the original disclosure.

As to claim 16:

The claim has been amended to recite rotating to clean the upper and lower surfaces of the substrate, respectively, along the same direction as a progress direction of the substrate.

Such is not supported by the original disclosure.

As to claim 45:

The applicants amended the claims to recite "moving the substrate between the first and second side brushes".

The original disclosure fails to support this limitation. The limitation is not supported for the entire scope. The original disclosure supports only a linear moving of the substrate such that the direction of moving of the substrate is parallel to the side brushes and parallel to the surface of the substrate. The limitation, which is now recited by the claim, also includes other movements of the substrate between the side brushes,

such as moving the substrate side-to-side and up-and-down. Such is not supported by the original disclosure.

The applicants further amended the claims to recite that the first and second side brushes are rotated to brush the first and the second side surfaces, respectively, to a lower direction or to an upper direction perpendicular to a progress direction of the substrate.

Such is not supported by the original disclosure. The original disclosure only supports rotation of the referenced brushes around their axis.

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The original disclosure fails to support this limitation. The limitation is not supported for the entire scope. The original disclosure supports only a linear moving of the substrate such that the direction of moving of the substrate is perpendicular to the upper and lower brushes and parallel to the surface of the substrate. The limitation, which is now recited by the claims, also includes other movements of the substrate between the upper and lower brushes, such as moving the substrate side-to-side and up-and-down. Such is not supported by the original disclosure.

The applicants further amended the claims to recite moving the substrate between first and second jetting devices.

The original disclosure fails to support this limitation. The limitation is not supported for the entire scope. The original disclosure supports only a linear moving of the substrate such that the direction of moving of the substrate is perpendicular to the

line between jetting devices and parallel to the surface of the substrate. The limitation, which is now recited by the claims, also includes other movements of the substrate between the jetting devices, such as moving the substrate side-to-side and up-and-down. Such is not supported by the original disclosure.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 13, 16, 18, 34, 35 and 45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claims 13, 16, 18, 34 and 35:

The claims are indefinite and/or incomplete because claim 13 as amended does not end with ".". Thereby it is not clear whether or not something is missing from the claim.

The claims are also indefinite because it is not clear from claim 13 what is referenced by the terms "a lower direction" and "an upper direction".

The claims are also indefinite because it is not clear what is referenced as "a progress direction of the substrate".

It appears that some text is missing at the clause starting with "fourth step".

Thereby it is not clear how the clause "rotation directions of the upper and lower brushes having the same direction..." Is the claim intended to recite rotation of

the upper and lower brushes? Is the recitation of the referenced rotation is missing?

The claims are further indefinite because it is not clear what is required by the recitation of “first to fourth side surfaces”. How many surfaces are required by the referenced limitation?

As to claim 16:

The claim is further indefinite because it recites “rotating to clean the upper and lower surfaces of the substrate” but fails to recite what is rotated.

The claim is further indefinite because it is not clear what is referenced by “rotating ... along the same direction”. What rotation is required by the recitation of “rotating along direction”?

As to claim 45:

The claim is indefinite because it is not clear what is required by the recitation of “first to fourth side surfaces”. How many side surfaces are required by the referenced limitation?

The claim is also indefinite because it is not clear what is referenced as “a progress direction of the substrate”.

The claim is also indefinite because it is not clear what is referenced by the terms “a lower direction” and “an upper direction”.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 13, 16, 18, 34, 35 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moinpour et al (US Patent No 5,901,399) in view of Fishkin et al (US Patent No 6,202,658), Hashimoto et al (US Patent No 6,261,378) and the state of the prior art admitted by the applicants in the specification.

Moinpour et al and Fishkin et al both teach cleaning substrates with brushes and sprays. Both documents are concerned about cleaning side surfaces of the substrates during cleaning of the main surfaces. Both documents teach brushing of the main surfaces and spraying the side surfaces. Moinpour et al teach the use of cylindrical brushes and a liquid jet to clean the side surfaces. See at least Figures 2c, 3, 6 and 7

and the related description. The document does not specify whether or not the liquid jet is energized. Fishkin et al teach the use of ultrasonic liquid jet to clean the side surfaces. Having the combined teachings of the cited documents it would have been obvious to an ordinary artisan at the time the invention was made to incorporate ultrasonic spray cleaning of Fishkin et al in the method of Moinpour et al instead or in addition to the spray of Moinpour et al to further enhance disclosed cleaning because the documents teach the action of brushes and ultrasonic to solve the same problem. An ordinary artisan would have been reasonably expected that the use of combined action would improve the side cleaning results. It would have also been obvious to include the referenced spray cleaning before, at the same point or after the brushing with reasonable expectation of adequate results in view of absence of unexpected results achieved by the claimed sequence of the steps. It is noted that Moinpour et al teach the use of their spray at or near the point of contact of the brush and the side surface (at least column 4, lines 42-45).

Moinpour et al and Fishkin et al do not specifically recite application of their methods to LCD substrates. Both of the documents are mainly directed to cleaning semiconductor wafers. Fishkin et al, however, teach that the method can be applied to glass substrates.

Hashimoto et al teach that the same method of cleaning are conventionally applied to semiconductor wafers and glass substrates, such LCD glass substrates.

The LCD substrates conventionally have a rectangular shape. This is evidenced at least by the state of the prior art admitted by the applicants in the specification.

Having combined teachings of Moinpour et al, Fishkin et al and Hashimoto et al it would have been obvious to an ordinary artisan at the time the invention was made to apply a modified method of Moinpour et al to LCD glass substrates with reasonable expectation of success in order to have the substrates cleaned.

As to the limitation requiring moving of the substrate and the side brushes being parallel to the referenced direction: it is noted that Moinpour et al show that in a scrubber the substrate is not only rotated, but also is moving through the scrubber in a linear direction. See at least Figure 3 the related description. It would have been obvious to an ordinary artisan at the time the invention was made that the brushes shown on Figures 2c, 6, and 7 should be parallel to the direction of the movement at least at some time to enable the movement.

As to the limitation requiring cleaning of two side surfaces: It would have been obvious to an ordinary artisan at the time the invention was made that all surfaces of the LCD substrate should be cleaned. It would have been obvious to an ordinary artisan at the time the invention was made to provide and use an additional brush and an additional spraying device of Fishkin et al in the modified method of Moinpour et al in order to clean opposing surfaces of the LCD substrate in a single move in order to enhance cleaning. It is noted that, it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

9. Claims 13, 16, 18, 34, 35 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over the state of the prior art admitted by the applicants in the

specification in view of Moinpour et al (US Patent No 5,901,399), Fishkin et al (US Patent No 6,202,658), and Hashimoto et al (US Patent No 6,261,378).

The applicants admitted in the specification (at least Figure 1 and the description at page 2, line 9 – page 4, line 6 that the conventional cleaning of LCD substrates comprises moving the substrate between an upper and a lower brush, which are rotated to clean the substrate.

On the other hand, Moinpour et al and Fishkin et al both teach cleaning substrates with brushes and sprays. Both documents are concern about cleaning side surfaces of the substrates during cleaning of the main surfaces. Both documents teach brushing of the main surfaces and spraying the side surfaces. Moinpour et al teach the use of cylindrical brushes and a liquid jet to clean the side surfaces. See at least Figures 2c, 3, 6 and 7 and the related description. Fishkin et al teach the use of ultrasonic liquid jet to clean the side surfaces.

Moinpour et al and Fishkin et al do not specifically recite application of their methods to LCD substrates. Both of the documents are mainly directed to cleaning semiconductor wafers. Fishkin et al, however, teach that the method can be applied to glass substrates.

However, Hashimoto et al teach that the same method of cleaning are conventionally applied to semiconductor wafers and glass substrates, such LCD glass substrates.

Having the combined teachings of the admitted prior art and the cited documents it would have been obvious to an ordinary artisan at the time the invention was made to

incorporate cleaning of the side surfaces into a conventional cleaning of LCD substrates disclosed by the admitted prior art. It would have been obvious to an ordinary artisan at the time the invention was made to incorporate ultrasonic spray cleaning of Fishkin et al and brush cleaning of Moinpour et al to clean the side surfaces the cited documents teach the action of brushes and ultrasonic for cleaning side surfaces. An ordinary artisan would have been reasonably expected that the use of combined action would improve the side cleaning results.

Response to Arguments

10. Applicant's arguments filed 2/15/11 have been fully considered but they are not persuasive.

The applicants amended the claims.

The applicants alleged that the previously applied rejections are not proper with the amended claims.

The applicants argue that the amended claims require a sequence of performing the disclosed steps.

This is not persuasive.

None of the amended claims is limited to require any sequence of the claims.

The applicants further allege that the claims require the side brushes being rotated to a lower or upper direction perpendicular to the progress of the substrate. The applicants allege that Moinpour does not disclose such.

This is not persuasive.

First, the referenced limitations are indefinite and unsupported for the reasons indicated above.

Second, in contrast to the applicants' statement, Moinpour shows that in a scrubber the substrate is not only rotated, but also is moving through the scrubber in a linear direction. See at least Figure 3 the related description. This was indicated in the rejection. The applicants failed to comment on this.

The applicants further allege that in the claimed invention the frictional force between the side brushes and the side sides of the substrate is highly strong and thereby the substances are more easily removed than in Moinpour.

The referenced allegation is appeared to be based on incomplete analysis of the teaching of Moinpour, is not supported by any factual evidence, is commensurate with the scope of the claims (the claims fail to recite any specific friction force) and thereby not persuasive.

The applicants further allege that the rotation of upper and lower brushes have the same direction as a progress direction of the substrate.

The applicants further allege that Moinpour et al fail to teach such.

This is not persuasive.

First, the argued limitations are indefinite for the reasons provided above.

Second it is again noted that Moinpour et al teach moving the substrate in the scrubber, not only rotating it.

Thereby the applicants' argument regarding have directions is without grounds.

Since the argued limitation could not be properly understood it is believed that what is disclosed by Moinpour et al with respect to moving the substrate and rotating the upper and the lower brushes is readable on what is claimed.

Further, it is noted that Moinpour et al do not require any specific direction of rotation of the brushes. It is further noted that the rejection of the claims is made over the combination of Moinpour et al, Fishkin et al, Hashimoto et al and the state of the prior art admitted by the applicants. It is further noted, that what is shown as the prior art cleaning at Figure 1 and what is shown as inventive cleaning at Figure 2 have the correlation between the rotation of the upper and lower brushes and the moving of the substrate. Thereby if the claims would be amended to be limited to the correlation between the rotation of the upper and lower brushes and the movement of the substrate that is disclosed at Figure 2, the teaching of the admitted prior art may be applied to address such limitation.

It is noted that the applicants alleged that if the brushes and wafer of Fishkin et al and Moinpour et al are applied to the claimed invention, the cleaning against of all surfaces of the substrate is never fully insured.

The argument is not persuasive because the rejection does not require application of the brushes and wafer of Moinpour et al and Fishkin et al to the claimed invention.

The rejection is based on the teaching of Moinpour et al, Fishkin et al, Hashimoto et al and the state of the prior art admitted by the applicants.

Further, it is noted that Hashimoto et al teach that the same method of cleaning are conventionally applied to semiconductor wafers and glass substrates, such LCD glass substrates.

If the applicants would wish to discuss the rejections presented in the instant Office action or would have any specific suggestions how to advance the prosecution of the application, the request for interview would be granted.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Markoff whose telephone number is 571-272-1304. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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